PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty

For receiving Office use only **09/856314**

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

Box No. I TITLE OF INVENTION

A WARP KNIT HAVING AN EXCELLENT TOUCH, AND A PROCESS OF PREPARING THE SAME

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State(that is, country) of resicence if no State of residence is indicated below.)*

☐ This person is also inventor.

KOLON INDUSTRIES, INC.

KOLON TOWER, 1-23, Byulyang-dong,

Kwacheon-city, Kyunggi-do, 427-040,

Republic of Korea

Telephone No.:
02-3677-4021

Facsimile No.:
02-3677-4089

Teleprinter No.:

State(*that is, country*) of nationality	State(*that is, country*) of residence
KR	KR

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State(that is, country) of resicence if no State of residence is indicated below.)*

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(if this check-box is amred, do not fill in below)*

YOON, JOON YOUNG

881-10 Manduk-dong, Buk-gu, Busan-city, 616-110

Republic of Korea

State(*that is, country*) of nationality	State(*that is, country*) of residence
KR	KR

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common resentative

Name and address: *(Family name followed by given name; for a legal entity full official designation. The address must include postal code and name of country.)*

CHO, HWAL RAI

Suite 1507, Yoksam Heights, 642-19

Yoksam-dong,Kangnam-ku, Seoul-city 135-080,

Republic of Korea

Telephone No.:
02-552-4506

Facsimile No.:
02-552-4508

Teleprinter No.:

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III   FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State(that is, country) of resicence if no State of residence is indicated below.)*

CHOI, YOENG BEEK

107-606 3th. Hwasung-town, 915 Dongchun-dong, Buk-gu,

Daegu-city 702-250

Republic of Korea

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only*(if this check-box is amred, do not fill in below)*

State*(that is, country)* of nationality	State*(that is, country)* of residence
KR	KR

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State(that is, country) of resicence if no State of residence is indicated below.)*

CHO, DAE HYUN

307-507 Green-APT, Boon-dong, Dalse-gu,

Daegu-city, 704-350

Republic of Korea

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only*(if this check-box is amred, do not fill in below)*

State*(that is, country)* of nationality	State*(that is, country)* of residence
KR	KR

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State(that is, country) of resicence if no State of residence is indicated below.)*

This person is:

☐ applicant only

☐ applicant and inventor

☐ inventor only*(if this check-box is amred, do not fill in below)*

State*(that is, country)* of nationality	State*(that is, country)* of residence

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State(that is, country) of resicence if no State of residence is indicated below.)*

This person is:

☐ applicant only

☐ applicant and inventor

☐ inventor only*(if this check-box is amred, do not fill in below)*

State*(that is, country)* of nationality	State*(that is, country)* of residence

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No. V   DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

☐ **AP** **ARIPO Patent: GH** Ghana, **GM** Gambia, **KE** Kenya, **LS** Lesotho, **MW** Malawi, **MZ** Mozambique, **SD** Sudan, **SL** Sierra Leone, **SZ** Swaziland, **TZ** United Republic of Tanzania, **UG** Uganda, **ZW** Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT

☐ **EA** **Eurasian Patent: AM** Armenia, **AZ** Azerbaijan, **BY** Belarus, **KG** Kyrgyzstan, **KZ** Kazakhstan, **MD** Republic of Moldova, **RU** Russian Federation, **TJ** Tajikistan, **TM** Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

☒ **EP** **European Patent: ES** Spain, **IT** Italy, **PT** Portugal,

☐ **OA** **OAPI Patent: BF** Burkina Faso, **BJ** Benin, **CF** Central African Republic, **CG** Congo, **CI** Cote d'Ivoire, **CM** Cameroon, **GA** Gabon, **GN** Guinea, **GW** Guinea-Bissau, **ML** Mali, **MR** Mauritania, **NE** Niger, **SN** Senegal, **TD** Chad, **TG** Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT*(if other kind of protection or treatment desired, specify on dotted line)*

National Patent*(if other kind of protection or treatment desired, specify on dotted line)*:

☐	**AE**	United Arab Emirates	☐	**LC**	Kazakhstan
☐	**AG**	Antigua and Barbuda	☐	**LK**	Sri Lanka
☐	**AL**	Albania	☐	**LR**	Liberia
☐	**AM**	Armenia	☐	**LS**	Lesotho
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☒	**BR**	Brazil	☐	**MK**	the former Yugoslav Republic of Macedonia
☐	**BY**	Belaus	☐	**MN**	Mongolia
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☐	**CA**	Canada	☒	**MX**	Mexico
☐	**CH and LI**	Switzerland and Liechtenstein	☐	**MZ**	Mozambique
☒	**CN**	China	☐	**NO**	Norway
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☐	**DM**	Dominica	☐	**SD**	Sudan
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☐	**EE**	Estonia	☐	**SG**	Singapore
☐	**ES**	Spain	☐	**SI**	Slovenia
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☐	**GH**	Ghana	☒	**TR**	Turkey
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☐	**HR**	Croatia	☐	**TZ**	United Republic of Tanzania
☐	**HU**	Hungary	☐	**UA**	Ukraine
☒	**ID**	Indonesia	☐	**UG**	Uganda
☐	**IL**	Israel	☒	**US**	United States of America
☐	**IN**	India	☐	**UZ**	Uzbekistan
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☐	**KG**	Kyrgyzstan	☐	**ZW**	Zimbabwe
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☐	**KR**	Republic of Korea			
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Check-boxs reserved for designating States which have become party to the PCT after issuance of this sheet:

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Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(S) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM		☐ Further priority claims are indicated in the Supplement Box.		
Filing date of earlier application *(day/month/year)*	Number of earlier application	Where earlier application is		
		national application: country	regional application:* regional Office	international application: regional Office
item(1) 19 September 2000 (19, 09, 2000)	2000-54836	KR		
item(2) 19 September 2000 (19, 09, 2000)	2000-54837	KR		
item(3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item*(s)*:

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplementary Box at least one country party to the Paris convention for the Protection of Industrial Property for which that earlier application was filed(Rule 4.10(b)(ii) See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority(ISA) *(if two or more International Searching Authorities are competent to carry the international search, indicate the Authority chosen, the two-letter code may be used):*	**Request to use the results of earlier search; reference to that search***(if an earlier search has been carried out or requested from the International Searching Authority):*
ISA/ KR	Date*(day/month/year)* Number Country*(or regional Office)*

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:	This international application is accompanied by the item(s) marked below:
request : 4	1. ☒ fee calculation sheet
description(excluding sequence listing part) : 15	2. ☒ separate signed power of attorney
claims : 2	3. ☐ copy of general power of attorney; reference number, if any:
abstract : 1	4. ☐ statement explaining lack of signature
drawings : 1	5. ☐ priority document(s) identified in Box No. VI as item(s)
sequence listing part of description : 0	6. ☐ translation of international application into(language)
	7. ☐ separate indications concerning deposited microorganism or other biological material
	8. ☐ nucleotide and/or amino acid sequence listing in computer reader form
Total number of sheets : 23	9. ☐ other*(specify)* :

Figure of the drawings which should accompany the abstract:	Language of filing of the international application: KOREAN

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs(if such capacity is not obvious from reading the request).

CHO, HWAL RAI

1. Date of actual receipt of the purported international application :	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application :	☐ received:
4. Date of timely receipt of the required corrections under PCT Article 11(2) :	☐ not received:
5. International Searching Authority (if two or more are competent) : **ISA/**	6. ☐ Transmittal of search copy delayed until search fee is paid

———— For International Bureau use only ————

Date of receipt of the record copy by the International Bureau:

This sheet is not part of and does not count as a sheet of the international application

PCT

FEE CALCULATION SHEET

Annex to the Request

Applicant's or agent's
file reference

Applicant   KOLON INDUSTRIES, INC. et al

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE .... | 45,000 | T |

2. SEARCH FEE .... | 150,000 | S |

International search to be carried out by   Korean Patent Office

(if two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search)

3. INTERNATIONAL FEE

Basic Fee

The international application contains __23__ sheets.

first 30 sheets ----------------------------- | 464,100 | b1 |

_____ x _____ = | | b2 |
remaining sheets   additional amount

Add amounts entered at b1 and b2 and enter total at B -------- | 464,100 | B |

Designation Fees

The international application contains ___9___ designations.

_____8_____ x ___100,000___ = | 800,000 | D |
number of designation fees   amount of designation fee
payable*(maximum 8)*

Add amounts entered at B and D and enter total I -------------- | 1,264,100 | I |

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D)

4. FEE FOR PRIORITY DOCUMENT *(if applicable)* -------------- | | P |

5. TOTAL FEES PAYABLE ----------------------------------- | 1,459,100 |
Add amounts entered at T, S, I and P, and enter total in the TOTAL box | TOTAL |

| | The designation fees are not paid at this time.

MODE OF PAYMENT

[ ]	Authorization to charge deposit account(see below)	[ ]	bank draft	[ ]	coupons
[ ]	cheque	[X]	cash	[ ]	other *(specify)*
[ ]	postal money order	[ ]	revenue stamps		

DEPOSIT ACCOUNT AUTHORIZATION *(this mode of payment may not be available at all receiving Offices)*

The RO/ _____ [ ] is hereby authorized to charge the total fees indicated above to my deposit account.

[ ] *(this check-box may be marked only if the conditions for deposit accounts of the* receiving Office *so permit)* is hereby authorixed to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

[ ] is hereby authorized to charge the fee for prepatation and transmittal of the priority document to the International Bereau of WIPO to my diposit account.

Deposit Account Number   Date*(day/month/year)*   signature
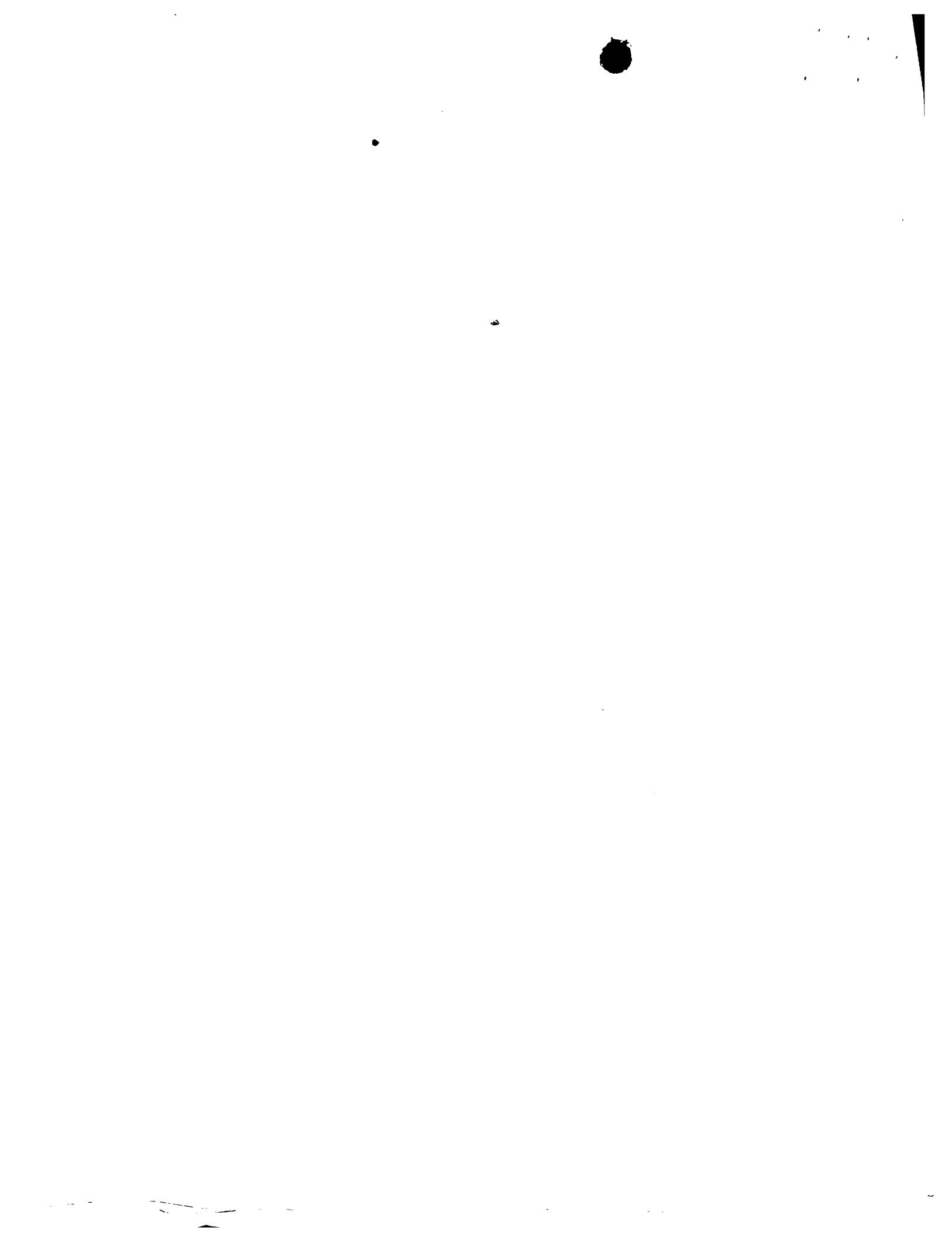
07856314

INTERNATIONAL SEARCH REPORT

A.	**CLASSIFICATION OF SUBJECT MATTER**

IPC7 D04B 21/12

According to International Patent Classification (IPC) or to both national classification and IPC

B.	**FIELDS SEARCHED**

Minimun documentation searched (classification system followed by classification symbols)
IPC7 D04B

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched
KR IPC AS ABOVE
JP IPC AS ABOVE

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

C.	**DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR2000-13798 A(JANG) MAR. 06, 2000 (FAMILY NONE) see the whole document *date no good. not an X reference*	1-8
X	KR95-3509 A(WHA) FEB. 17, 1995 (FAMILY NONE) see the whole document	1-8
A	JP7-207551 A(DAKAI) AUG. 08, 1995 (FAMILY NONE) see the whole document	1-8
A	JP7-243158 A(BARATO) SEP.19, 1995 (FAMILY NONE) see the whole document	1-8

☐ Further documents are listed in the continuation of Box C.   ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevence		
"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)	"Y"	document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 JUNE 2001 (11.06.2001)	15 JUNE 2001 (15.06.2001)

Name and mailing address of the ISA/KR	Authorized officer
Korean Industrial Property Office Government Complex-Taejon, Dunsan-dong, So-ku, Taejon ~~Metropolitan City 302-701, Republic of Kor~~	CHO, Sung Ho

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

$9/856314$

(51) International Patent Classification[7]: **D04B 21/12**

(21) International Application Number: PCT/KR00/01196

(22) International Filing Date: 24 October 2000 (24.10.2000)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
2000/54836   19 September 2000 (19.09.2000)   KR
2000/54837   19 September 2000 (19.09.2000)   KR

(71) Applicant *(for all designated States except US)*: **KOLON INDUSTRIES, INC.** [KR/KR]; Kolon Tower, 1-23, Byulyang-dong, Kwacheon-city, Kyunggi-do 427-040 (KR).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **YOON, Joon,**

Young [KR/KR]; 881-10, Manduk-dong, Buk-gu, Busan-city 616-110 (KR). **CHOI, Yoeng, Beek** [KR/KR]; 107-606 3th Hwasung-town, 915 Dongchun-dong, Buk-gu, Daegu-city 702-250 (KR). **CHO, Dae, Hyun** [KR/KR]; 307-507 Green-Apt., Boon-dong, Dalse-gu, Daegu-city 704-350 (KR).

(74) Agent: **CHO, Hwal, Rai**; Suite 1507, Yoksam Heights, 642-19, Yoksam-dong, Kangnam-ku, Seoul-city 135-080 (KR).

(81) Designated States *(national)*: BR, CN, ID, JP, MX, TR, US, VN.

(84) Designated States *(regional)*: European patent (ES, IT, PT).

Published:
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: A WARP KNIT HAVING AN EXCELLENT TOUCH, AND A PROCESS OF PREPARING THE SAME
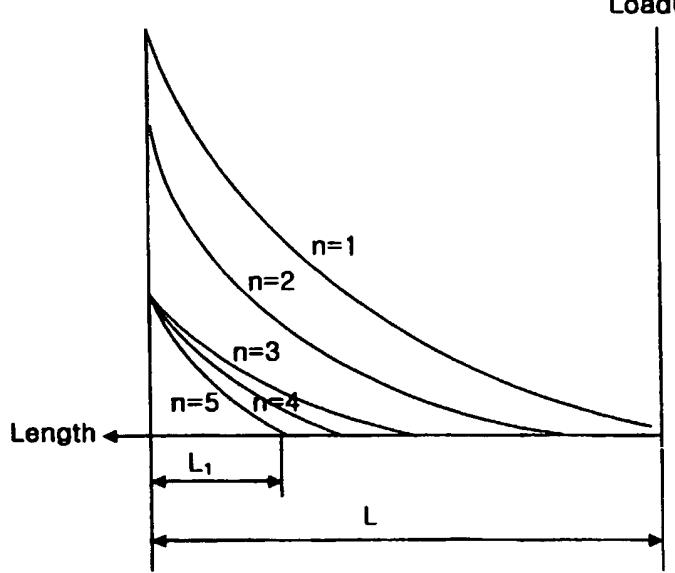
(57) Abstract: The present invention relates to a warp knit having excellent touch and a process of preparing such a warp knit. The present invention provides a warp knit comprising three layers, namely a fron t surface layer, and an intermediate layer arranged between the front surface layer and the rear surface layer, the front surface layer consisting of ultra fine yarn with mono-filament denier of 0.01-0.3 denier, the intermediate layer consist of spandex elastic yarn, the rear surface layer consisting of synthetic yarn or high shrinkage yarn with mono-filament denier of 1-5 denier, wherein the recivery rate of elongation in the directions of wale and course is 25-60 %. The warp knit according to the present invention is used to manufacture artificial leathers or ladies' clothes.

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A WARP KNIT HAVING AN EXCELLENT TOUCH, AND A PROCESS OF

PREPARING THE SAME

TECHNICAL FIELD

5   The present invention relates to a warp knit having excellent touch

and a process of preparing such a warp knit.

More particularly, the present invention relates to a warp knit with

softness and draping property due to its very fine structure and thus useful

for materials of artificial leathers or ladies' clothes, and a process of

10   preparing such a warp knit.

BACKGROUND ART

If a fiber becomes fined, its bending strength becomes weakened.

Accordingly, since fabrics produced with ultra fine fiber have very soft

15   touch, researches in connection with producing such ultra fine fiber on a

commercial scale are developing very actively. Also, development of the

technology which is capable of producing synthetic yarn extremely finely

leads to great improvement of the value of the goods of sensitive materials

for clothes.

20   Generally, a process of preparing ultra fine fiber is divided into

three processes: a direct spinning process; a two components division type

spinning process; and a two components extraction type spinning process.

In the direct spinning process, it is possible to prepare ultra fine fiber of

$0.3 \sim 0.5$ denier. In the two components division type spinning process, it is

5   possible to prepare ultra fine fiber of 0.2 denier. In the two components

extraction type spinning process, it is possible to prepare ultra fine fiber of

0.01 denier or below.

In case that the ultra fine fiber prepared by means of the direct

spinning process is applied to a warp knit, warping property and

10   appearance of the warp knit is very poor since numerous filaments are

scattered. Furthermore, the warp knit thus prepared is very inferior in

touch and writing effect.

In case that the ultra fine fiber prepared by means of the two

components division type composite spinning process consisting of

15   nylon/polyester is applied to a warp knit, warping property and knitting

property of the warp knit is very poor since the nylon is isolated from the

polyester by means of the tension and friction in warping and knitting.

Furthermore, appearance of the prepared product is very poor due to limit

of the denier of the ultra fine fiber.

20   In case that the composite fiber of 0.05 denier or below prepared by

means of the two components extraction type spinning process is applied

to a warp knit, warping property, knitting property and touch of the warp

knit are good; however, density in the structure of the warp knit is

loosened and thus appearance of the warp knit is poor since the extraction

5   component is extracted at the following processing step for producing in

ultra fine fiber. Furthermore, the warp knit prepared by means of the

afore-said process is inferior in shape stability and flexibility thereof.

Producing goods with ultra fine fiber are developing in variety in

connection with textile applications. However, producing goods with ultra

10   fine fiber are not developing connection with knitting applications since the

poor warping property and the several drawbacks generated at the

following processing step as mentioned above.

Accordingly, it is an object of the present invention to prepare a

warp knit, which has excellent touch, shape stability, flexibility, and

15   appearance, and thus is suitable for materials of ladies' clothes, with good

warping property and knitting property.

DISCLOSURE OF THE INVENTION

The present invention provides a warp knit which has excellent

20   touch, shape stability, flexibility, and appearance, and thus is suitable for

materials of ladies' clothes. The present invention also provides a process

of preparing such a warp knit with good warping property and knitting

property.

More particularly, the present invention relates to a warp knit

5   comprising three layers, namely a front surface layer, a rear surface layer,

and an intermediate layer arranged between the front surface layer and the

rear surface layer, the front surface layer consisting of ultra fine yarn with

mono-filament denier of 0.01~0.3 denier, the intermediate layer

consisting of spandex elastic yarn, the rear surface layer consisting of

10   synthetic yarn or high shrinkage yarn with mono-filament denier of 1~5

denier, wherein the recovery rate of elongation in the directions of wale

and course is 25~60 %.

The present invention also relates to a process of preparing a warp

knit having excellent touch, characterized in that firstly, knitting a warp

15   knit by using a composite fiber consisting of a fiber formation component

of 0.01~0.3denier and a extraction component as a yarn of a front surface

layer, a spandex elastic yarn as a yarn an intermediate layer, and a

polyester yarn or high shrinkage yarn with mono-filament of 1~5denier

as a yarn of a rear surface layer, and then raising the warp knit until the

20   shrinkage rate of the warp knit is reached 40% or more, and then

4

preliminarily heating, extracting the extraction component from the composite yarn, dyeing, buffing, and finally heating the warp knit continuously.

The present invention will now be described in more detail.

5   The inventor of the present application accomplished the present invention, taking notice of the fact that the selection and the combination of the materials in designing structure is very important in order to prepare polyester warp knit which is as soft as natural suede and which has excellent appearance as well as excellent warping property and knitting

10   property.

Fist of all, the present invention uses a composite fiber consisting of fiber formation components of 0.01~0.3 denier and extraction component as a yarn of the front surface layer. If the extraction component is removed from the composite fiber, the fiber formation component with

15   mono-filament denier of 0.01~0.3 denier is only remained. If the mono-filament denier of the yarn at the front surface layer is more than 0.3 denier, its soft touch is poor and the writing effect is not revealed. If the mono-filament denier of the yarn at the front surface layer is less than 0.01 denier, its soft touch is maintained, but its appearance is poor since

20   the raised fiber are omitted or entangled due to friction.

It is preferable that polyester is used as the fiber formation component and copolyester with excellent alkali hydrolysis property is used as the extraction component of the composite fiber used as yarn of the front surface layer. The content of the extraction component in the

5   composite fiber is generally 20~40 % in weight.

It is preferable that the density of the yarn at the front surface layer is increased in order to improve the touch of the warp knit. It is possible for increasing the density of the yarn at the front surface layer to reduce the content of extraction component in the composite fiber during the

10   manufacturing stage ; however, it is curbed technically in spinning process, and there are limitations in increasing the density thereof even if the content of the extraction component in the composite fiber is reduced.

Accordingly, the present invention is characterized in that spandex elastic yarn are used as yarn of the intermediate layer, whereby the yarn

15   density of the front surface layer is increased by virtue of the shrinkage of the intermediate layer. The spandex elastic yarn, which is yarn of the intermediate layer, is of excellent shrinking property, therefore it increases the yarn density of the front surface layer on the finished warp knit, and provides good touch, flexibility and repulsiveness to the warp knit.

20   The total denier of the spandex elastic yarn is preferably between 30 and

90 denier.

Next, synthetic yarn with mono-filament denier of 1~5 denier, more preferably of polyester yarn or high shrinkage yarn, are used as the yarn of the rear surface layer. If the mono-filament denier of the yarn at the rear surface layer is less than 1 denier, draping property of the warp knit is decreased. If the mono-filament denier of the yarn at the rear surface layer is more than 5 denier, warping property and knitting property of the warp knit are deteriorated. If the regular polyester yarn is used as the yarn of the rear surface layer, mechanical stability and shape stability of the warp knit is improved. Concretely, of 50 denier/24 filament of polyester yarn is used as the yarn of the rear surface layer. The high shrinkage yarn has high shrinkage rate of boiling water, whereby it is prevented that ultra fine yarn are come out of the rear surface layer.

The high shrinkage yarn, which are used as the yarn of the rear surface layer, preferably have the shrinkage rate of boiling water of 15~50 % and the stress of the heat shrinkage of 0.2 g/d or more. If the shrinkage rate of boiling water is less than 15 %, it is not possible to increase the density of ultra fine yarn, which are the yarn of the front surface layer, and thus the touch is poor since the shrinkage is extremely low. If the shrinkage rate of boiling water is more than 50 %, it is possible

to increase the density of ultra fine yarn, which are the yarn of the front surface layer; however, it is hard to control the process width of the finished warp knit since the shrinkage is extremely high. Furthermore, if the stress of the heat shrinkage is less than 0.2 g/d, the stress between the

5 structural points is not overcome even if the shrinkage rate of boiling water is high, and therefore sufficient shrinkage is not provided.

Copolyester is preferably used as the high shrinkage yarn as mentioned above. Co-polymer components include bisphenol-A, polyethyleneglycol, isophthalic acid or the like. However, the present

10 invention is not limited to the co-polymer components as described above.

The content of the yarn of the front surface layer when it is knitted is preferably 40~87 % in weight of the total weight of the processed warp knit. If the content of the yarn of the front surface layer is less than 40 % in weight, the touch of the warp knit is poor. If the content of the yarn of the

15 front surface layer is more than 87 % in weight, the draping property and the mechanical property of the warp knit is deteriorated as the content of the yarn of the intermediate layer and the yarn of the rear surface layer are little relatively.

On the other hand, the content of the yarn of the intermediate layer

20 and the yarn of the rear surface layer is preferably 3~20 % in weight and

10~57 % in weight of the total weight of the processed warp knit, respectively. If the content of the yarn of the intermediate layer and the yarn of the rear surface layer is more than the range as mentioned above respectively , the touch of the warp knit is poor; and if the content of the

5   yarn of the intermediate layer and the yarn of the rear surface layer is less than the range as mentioned above respectively, the shape stability and the draping property of the warp knit are deteriorated.

The present invention is characterized in that such a raw warp knit as mentioned above is raised so that the shrinkage rate of the raw warp

10   knit is 40 % or more before preliminary heat treatment of the raw warp knit. After the raw warp knit is raised according to the present invention, it is preliminarily heat-treated as usual, and it is treated in alkali solution, thereby the extraction component is removed from the composite fiber. After that, the warp knit is dyed, buffered and finally heat-treated. It is

15   preferable to maintain the density of the processed warp knit at 40~80 each/inch so that excellent touch and the shape stability is obtained.

The warp knit of the present invention is composed densely out of ultra fine yarn with mono-filament denier of 0.01~0.3 denier, whereby its touch and appearance are very excellent. Especially, as the warp knit of

20   the present invention includes the intermediate layer consisting of spandex

elastic yarn with excellent flexibility, the density of the ultra fine yarn at the front surface layer is higher, and recovery rate of elongation of a warp knit in the directions of the wale and the course is 25~60 %, which represents excellence. Also, as the warp knit of the present invention

5   includes the rear surface layer consisting of the yarn of regular synthetic yarn with mono-filament denier of 1~5 denier, the shape stability and the mechanical property of the warp knit are excellent.

As described in detail above, the warp knit of the present invention has excellent touch, appearance, flexibility, shape stability, and draping

10   property, and thus it is suitable for materials of ladies' clothes or materials of artificial leathers.

The properties of the warp knit according to the present invention are evaluated as follows:

Softness

15   Softness of the warp knit is evaluated from the sensitive examination by ten specialists. If more than eight specialists determine that the warp knit is soft, it is excellent. If five~seven specialists determine that the warp knit is soft, it is ordinary. If more than eight specialists determine that the warp knit is not soft, it is poor.

20   Draping property

Draping property of the warp knit is evaluated from the sensitive examination by ten specialists. If more than eight specialists determine that the warp knit has draping property, it is excellent. If five~seven specialists determine that the warp knit has draping property, it is ordinary.

5   If more than eight specialists determine that the warp knit has poor draping property, it is poor.

Writing effect

Writing effect of the warp knit is evaluated from the sensitive examination by ten specialists. If more than eight specialists determine

10   that the warp knit has writing effect, it is excellent. If five~seven specialists determine that the warp knit has writing effect, it is ordinary. If more than eight specialists determine that the warp knit has poor writing effect, it is poor.

Appearance

15   Appearance of the warp knit is evaluated from the sensitive examination by ten specialists. If more than eight specialists determine that the warp knit has good appearance, it is excellent. If five~seven specialists determine that the warp knit has good appearance, it is ordinary. If more than eight specialists determine that the warp knit has poor

20   appearance, it is poor.

Recovery rate of elongation (%)

Total measurement is carried out according to KSK 08125, but proper elongation length when being elongated at the constant velocity is output by using JIS L 1096. Both ends of a sample of the warp knit with

5   length of 10 cm and width of 15 cm are fixed to Instron. The warp knit is elongated constantly at the stretching velocity of 100 mm/min until the load of 750 g is reached. The warp knit is left as it is with the load being removed. Next, the warp knit is elongated at the constant velocity up to the original position. And then, the warp knit is left as it is for three minutes

10   with the load being removed. The above process is repeatedly carried out five times. Finally, the elongated length L and the free elongated length L_1 are measured. The free elongated length L_1 is obtained by subtraction of the length measured after the warp knit is left as it is from the elongated length L (See Fig. 1). The recovery rate of elongation is obtained by

15   putting the elongated length (L) and the free elongated length (L_1) in the following equation:

recovery rate of elongation (%) = [elongated length (L) − free elongated length (L_1)]/elongated length (L) × 100

20   BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a graph showing recovery rate of elongation of a warp knit

5   measured using an Instron in accordance with the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention is now understood more concretely by comparison between examples of the present invention and comparative

10   examples. However, the present invention is not limited to such examples.

Example 1

At first, prepare the raw warp knit by using a extraction type composite   fiber,   which   the   fiber   formation   component   is polyethyleneterephtalate and the extraction component is copolyester

15   copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and which is prepared 0.05 denier of ultra fine yarn after removing the extraction component, as a yarn of the front surface layer, and then using spandex elastic yarn of 40 denier/ 5 filamnet as a yarn of the intermediate layer, and then using polyester yarn with mono filament of 5 denier as a

20   yarn of the rear surface layer.   At this time, ratio in weight of the yarn of

the front surface layer : the yarn of the intermediate layer : the yarn of the

rear surface layer is 55 % in weight : 10 % in weight : 35 % in weight.

Next, treat the manufactured raw warp knit by raising machine untill the

shrinkage of the warp knit is reached 50%.   And then, after heating the

5   warp knit at 190℃ preliminarily, dipping the warp knit in NaOH

solution(1% concentration) during 30 minutes at 98℃ in other to remove

the extraction component of composite fiber.   And then prepare a

processed warp knit having the density of 60 each/inch by dyeing(with

disperse dyes), buffing and heating at 180℃ finally the above mentioned

10   warp knit.   And then, evaluate the properties of the processed warp knit

as above mentioned methods.   The results of evaluation were indicated

in Table 1.

        Example 2

        At first, prepare the raw warp knit by using a extraction type

15   composite   fiber,   which   the   fiber   formation   component   is

polyethyleneterephtalate and the extraction component is copolyester

copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and

which is prepared 0.07 denier of ultra fine yarn after removing the

extraction component, as a yarn of the front surface layer, and then using

20   spandex elastic yarn of 40 denier/ 5 filamnet as a yarn of the intermediate

layer, and then using polyester yarn with mono filament of 3 denier as a

yarn of the rear surface layer.   At this time, ratio in weight of the yarn of

the front surface layer : the yarn of the intermediate layer : the yarn of the

rear surface layer is 60 % in weight : 5 % in weight : 35 % in weight.

5   Next, treat the manufactured raw warp knit by raising machine untill the

shrinkage of the warp knit is reached 55%.   And then, after heating the

warp knit at 190℃ preliminarily, dipping the warp knit in NaOH

solution(1% concentration) during 30 minutes at 98℃ in other to remove

the extraction component of composite fiber.   And then prepare a

10   processed warp knit having the density of 55 each/inch by dyeing(with

disperse dyes), buffing and heating at 180℃ finally the above mentioned

warp knit.   And then, evaluate the properties of the processed warp knit

as above mentioned methods.   The results of evaluation were indicated

in Table 1.

15   Example 3

At first, prepare the raw warp knit by using a extraction type

composite   fiber,   which   the   fiber   formation   component   is

polyethyleneterephtalate and the extraction component is copolyester

copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and

20   which is prepared 0.05 denier of ultra fine yarn after removing the

extraction component, as a yarn of the front surface layer, and then using

spandex elastic yarn of 40 denier/ 5 filamnet as a yarn of the intermediate

layer, and then using copolyester yarn with mono filament of 5 denier and

shrinkage rate of boiling water of 28%(high shrinkage yarn) as a yarn of

5   the rear surface layer.   At this time, ratio in weight of the yarn of the front

surface layer : the yarn of the intermediate layer : the yarn of the rear

surface layer is 55 % in weight : 10 % in weight : 35 % in weight.   Next,

treat the manufactured raw warp knit by raising machine untill the

shrinkage of the warp knit is reached 50%.   And then, after heating the

10   warp knit at 190℃ preliminarily, dipping the warp knit in NaOH

solution(1% concentration) during 30 minutes at 98℃ in other to remove

the extraction component of composite fiber.   And then prepare a

processed warp knit having the density of 60 each/inch by dyeing(with

disperse dyes), buffing and heating at 180℃ finally the above mentioned

15   warp knit.   And then, evaluate the properties of the processed warp knit

as above mentioned methods.   The results of evaluation were indicated

in Table 1.

    Example 4

    At first, prepare the raw warp knit by using a extraction type

20   composite   fiber,   which   the   fiber   formation   component   is

polyethyleneterephtalate and the extraction component is copolyester

copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and

which is prepared 0.07 denier of ultra fine yarn after removing the

extraction component, as a yarn of the front surface layer, and then using

5   spandex elastic yarn of 40 denier/ 5 filamnet as a yarn of the intermediate

layer, and then using copolyester yarn of with mono filament 3 denier and

shrinkage rate of boiling water of 20%(high shrinkage yarn) as a yarn of

the rear surface layer.   At this time, ratio in weight of the yarn of the front

surface layer : the yarn of the intermediate layer : the yarn of the rear

10   surface layer is 60 % in weight : 5 % in weight : 35 % in weight.   Next,

treat the manufactured raw warp knit by raising machine untill the

shrinkage of the warp knit is reached 55%.   And then, after heating the

warp knit at 190℃ preliminarily, dipping the warp knit in NaOH

solution(1% concentration) during 30 minutes at 98℃ in other to remove

15   the extraction component of composite fiber.   And then prepare a

processed warp knit having the density of 55 each/inch by dyeing(with

disperse dyes), buffing and heating at 180℃ finally the above mentioned

warp knit.   And then, evaluate the properties of the processed warp knit

as above mentioned methods.   The results of   evaluation were indicated

20   in Table 1.

Comparative example 1

At first, prepare the raw warp knit by using a extraction type composite fiber, which the fiber formation component is polyethyleneterephtalate and the extraction component is copolyester

5 copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and which is prepared 0.05 denier of ultra fine yarn after removing the extraction component, as a yarn of the front surface layer, and then using polyester yarn with mono filament of 0.5 denier as a yarn of the rear surface layer.   At this time, ratio in weight of the yarn of the front surface

10 layer : the yarn of the rear surface layer is 55 % in weight : 45 % in weight. Next, treat the manufactured raw warp knit by raising machine untill the shrinkage of the warp knit is reached 50%.   And then, after heating the warp knit at 190℃ preliminarily, dipping the warp knit in NaOH solution(1% concentration) during 30 minutes at 98℃ in other to remove

15 the extraction component of composite fiber.   And then prepare a processed warp knit having the density of 60 each/inch by dyeing(with disperse dyes), buffing and heating at 180℃ finally the above mentioned warp knit.   And then, evaluate the properties of the processed warp knit as above mentioned methods.   The results of evaluation were indicated

20 in Table 1.

Comparative example 2

At first, prepare the raw warp knit by using a extraction type
composite   fiber,   which   the   fiber   formation   component   is
polyethyleneterephtalate and the extraction component is copolyester
5   copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and
which is prepared 0.4 denier of ultra fine yarn after removing the
extraction component, as a yarn of the front surface layer, and then using
polyester yarn with mono filament of 0.5 denier as a yarn of the rear
surface layer.   At this time, ratio in weight of the yarn of the front surface
10   layer : the yarn of the rear surface layer is 60 % in weight : 40 % in weight.
Next, treat the manufactured raw warp knit by raising machine untill the
shrinkage of the warp knit is reached 20%.   And then, after heating the
warp knit at 190℃ preliminarily, dipping the warp knit in NaOH
solution(1% concentration) during 30 minutes at 98℃ in other to remove
15   the extraction component of composite fiber.   And then prepare a
processed warp knit having the density of 60 each/inch by dyeing(with
disperse dyes), buffing and heating at 180℃ finally the above mentioned
warp knit.   And then, evaluate the properties of the processed warp knit
as above mentioned methods.   The results of evaluation were indicated
20   in Table 1.

Comparative example 3

At first, prepare the raw warp knit by using a extraction type composite fiber, which the fiber formation component is polyethyleneterephtalate and the extraction component is copolyester

5   copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and which is prepared 0.05 denier of ultra fine yarn after removing the extraction component, as a yarn of the front surface layer, and then using polyester yarn with mono filament of 10 denier as a yarn of the rear surface layer.   At this time, ratio in weight of the yarn of the front surface

10   layer : the yarn of the rear surface layer is 55 % in weight : 45 % in weight. Next, treat the manufactured raw warp knit by raising machine untill the shrinkage of the warp knit is reached 55%.   And then, after heating the warp knit at 190℃ preliminarily, dipping the warp knit in NaOH solution(1% concentration) during 30 minutes at 98℃ in other to remove

15   the extraction component of composite fiber.   And then prepare a processed warp knit having the density of 60 each/inch by dyeing(with disperse dyes), buffing and heating at 180℃ finally the above mentioned warp knit.   And then, evaluate the properties of the processed warp knit as above mentioned methods.   The results of evaluation were indicated

20   in Table 1.

Comparative example 4

At first, prepare the raw warp knit by using a extraction type composite fiber, which the fiber formation component is polyethyleneterephtalate and the extraction component is copolyester

5   copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and which is prepared 0.05 denier of ultra fine yarn after removing the extraction component, as a yarn of the front surface layer, and then using polyester yarn with mono filament of 0.5 denier as a yarn of the rear surface layer.   At this time, ratio in weight of the yarn of the front surface

10   layer : the yarn of the rear surface layer is 55 % in weight : 45 % in weight. Next, treat the manufactured raw warp knit by raising machine untill the shrinkage of the warp knit is reached 50%.   And then, after heating the warp knit at 190℃ preliminarily, dipping the warp knit in NaOH solution(1% concentration) during 30 minutes at 98℃ in other to remove

15   the extraction component of composite fiber.   And then prepare a processed warp knit having the density of 60 each/inch by dyeing(with disperse dyes), buffing and heating at 180℃ finally the above mentioned warp knit.   And then, evaluate the properties of the processed warp knit as above mentioned methods.   The results of   evaluation were indicated

20   in Table 1.

Comparative example 5

At first, prepare the raw warp knit by using a extraction type composite fiber, which the fiber formation component is polyethyleneterephtalate and the extraction component is copolyester

5   copolymerized with 7 mole% of dimethylene sulfurisophthalic sodium, and which is prepared 0.05 denier of ultra fine yarn after removing the extraction component, as a yarn of the front surface layer, and then using polyester yarn with mono filament of 10 denier as a yarn of the rear surface layer.   At this time, ratio in weight of the yarn of the front surface

10   layer : the yarn of the rear surface layer is 55 % in weight : 45 % in weight. Next, treat the manufactured raw warp knit by raising machine untill the shrinkage of the warp knit is reached 55%.   And then, after heating the warp knit at 190℃ preliminarily, dipping the warp knit in NaOH solution(1% concentration) during 30 minutes at 98℃ in other to remove

15   the extraction component of composite fiber.   And then prepare a processed warp knit having the density of 60 each/inch by dyeing(with disperse dyes), buffing and heating at 180℃ finally the above mentioned warp knit.   And then, evaluate the properties of the processed warp knit as above mentioned methods.   The results of   evaluation were indicated

20   in Table 1.

Table 1: Results of property evaluation of warp knit

Class	softness	Draping property	Witting effect	appearance	Recovery rate of elongation(%)	
					In the direction of wale	In the direction of course
Example 1	Excellent	Excellent	Excellent	Excellent	41.9	37.6
Example 2	Excellent	Excellent	Excellent	Excellent	35.7	32.8
Example 3	Excellent	Excellent	Excellent	Excellent	42.2	38.7
Example 4	Excellent	Excellent	Excellent	Excellent	36.1	33.5
Comparative example 1	Ordinary	Poor	Excellent	Ordinary	20.0	18.6
Comparative example 2	Poor	Excellent	Poor	Ordinary	15.9	17.2
Comparative example 3	Poor	Excellent	Excellent	Ordinary	10.4	13.0
Comparative example 4	Ordinary	Poor	Excellent	Ordinary	20.2	18.6
Comparative example 5	Poor	Excellent	Excellent	Ordinary	10.4	13.0

INDUSTRIAL APPLICABILITY

As described above, the warp knit according to the present invention has excellent touch, appearance, elastic recovery rate, draping property, and thus is useful for materials of artificial leathers or ladies' clothes. Furthermore, the process of preparing such a warp knit according to the present invention has very excellent warping property and knitting property.

WHAT IS CLAIMED IS:

1. A warp knit having excellent touch, comprising: three layers, namely a front surface layer, a rear surface layer, and an intermediate

5   layer arranged between the front surface layer and the rear surface layer, the front surface layer consisting of ultra fine yarn with mono-filament denier of 0.01~0.3 denier, the intermediate layer consist of spandex elastic yarn, the rear surface layer consisting of synthetic yarn or high shrinkage yarn with mono-filament denier of 1~5 denier, wherein the

10   recovery rate of elongation in the directions of wale and course is 25~60 %.

2. The warp knit having excellent touch as claimed in claim 1, wherein content of the ultra fine yarn constituting the front surface layer is

15   40~87 % in weight of the total weight of the processed warp knit.

3. The warp knit having excellent touch as claimed in claim 1, wherein content of the spandex elastic yarn constituting the intermediate layer is 3~20 % in weight of the total weight of the processed warp knit.

20

4. The warp knit having excellent touch as claimed in claim 1, wherein content of the synthetic yarn or the high shrinkage yarn constituting the rear surface layer is 10~57 % in weight of the total weight of the processed warp knit.

5

5. The warp knit having excellent touch as claimed in claim 1, wherein the density of the processed warp knit is 40~80 each/inch.

6. The warp knit having excellent touch as claimed in claim 1,

10   wherein the ultra fine yarn and the synthetic yarn are polyester yarn.

7. The warp knit having excellent touch as claimed in claim 1, wherein the high shrinkage yarn is co-polyester yarn with 15~50% of shrinkage rate in boiling water.

15

8. A process of preparing a warp knit having excellent touch, characterized in that firstly, knitting a warp knit by using a composite fiber consisting of a fiber formation component of 0.01~0.3 denier and a extraction component as a yarn of a front surface layer, a spandex elastic

20   yarn as a yarn of an intermediate layer, and a polyester yarn or high

shrinkage yarn with mono-filament of 1~5 denier as a yarn of a rear

surface layer, and then raising the warp knit until the shrinkage rate of the

warp knit is reached 40% or more, and then preliminarily heating,

extracting the extraction component from the composite fiber, dyeing,

5   buffing, and finally heating the warp knit continuously.

9. The process of preparing a warp knit having excellent touch as

claimed in claim 8, wherein ratio in weight of the yarn of the front surface

layer : the yarn of the intermediate layer : the yarn of the rear surface

10   layer is 40~87 % in weight : 3~20 % in weight : 10~57 % in weight.

DRAWING

FIG 1